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ABSTRACT

This paper discusses the need to prepare teachers who are knowledgeable about current practices in technology and able to integrate computers into their own teaching, proposing that teaching assistants (TAs) be targeted for professional development in technology. The paper explains the rationale for making this recommendation and outlines the steps taken by the University of Washington to implement it in the teacher education program (TEP). The university planners believed that because TAs occupy a strategic position, providing them with professional development in technology would have immediate effects in courses. The program that was developed had four main parts. Planners began by incorporating International Society for Technology in Education/National Council for Accreditation of Teacher Education technology standards into preservice teacher education goals and targets. Next, they administered a survey to determine exactly what technology skills the TAs had. Then, they worked to improve the TA's skills through a series of workshops during a weekly seminar. Finally, they encouraged TAs to join TEP students in learning how to construct electronic portfolios. Two appendixes offer data on TA and TEP student computer competency and TA and TEP student computer skills. (Contains 16 references.) (SM)

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What Do Preservice Teacher Educators Need to Know About Technology? Using ISTE/NCATE Standards to Define and Develop Competencies

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What Do Preservice Teacher Educators Need to Know About Technology? Using ISTE/NCATE Standards to Define and Develop Competencies

Colleges of education are increasingly being called upon to prepare new teachers who are able to use technology in their teaching practice. School administrators, government officials, business people, and parents have come to see new information technologies as essential components of 21st century life and expect teachers not only to be able to take advantage of technology's educational potential, but also to develop technology skills among their students. As Cheryl Lemke notes: "Today's students live in a global, knowledge-based age, and they deserve teachers whose practice embraces the best that technology can bring to learning" (Moursund, 1999, p. i.).

Some education reformers advocate technology as a way to transform schools and improve the quality of their instructional programs (Herman, 1994). Indeed, there is evidence that technology, when used appropriately by teachers, can result in significant educational benefits for students. DeWert (1999a) cites some of the research supporting such a conclusion:

> ...there is a growing body of evidence that when information technologies are made available to teachers who understand how, when, and why to use these tools and resources to enhance teaching and learning, our nation's children realized important educational and workplace readiness benefits (Rockman, 1999; Schacter, 1999; Wenglinsky, 1998, p. 1)."

The problem has been that relatively few teachers understand how, when, and why to use technology for teaching and learning.

Prompted by studies claiming educational benefits for technology and demands from various stakeholders, billions of dollars have been spent

equipping K-12 schools with computers and modern communication networks. Resource allocation for helping teachers learn to use these technologies has often lagged far behind investments in hardware. Many have suggested we need redress the balance and focus more on preparing teachers to use technology—especially teachers just entering the field. Over the next decade, the federal government estimates that our educational system will need to hire approximately 2.2 million new teachers (Riley, 1998). Will these new teachers have the skills they need to function in high technology classrooms?

Research literature from the past decade shows clearly that preservice teachers are not being adequately prepared for teaching with technology (Willis & Mehlinger, 1996). More recent studies of information technology in teacher education reveal that the situation has not changed. The 1999 National Survey on Information Technology in Teacher Education sponsored by ISTE and the Milken Exchange found that: "...in general, teacher-training programs do not provide future teachers with the kinds of experiences necessary to prepare them to use technology effectively in their classrooms" (Moursund, 1999, p. i.). A national survey of teacher quality conducted by the National Center for Education Statistics (NCES, 1999) indicated that only 24% of new teachers (those with 3 or fewer years of teaching experience) felt very well prepared to integrate educational technology into the subject or grade level they taught" (p. 2).

One response to the evidence showing that new teachers were not being adequately prepared to use technology has been the development of local, state, and national standards for what teachers should know and be able to do with technology. Since 1995, the National Council for Accreditation of Teacher Education (NCATE) has been working with the International Society for Technology in Education (ISTE) to incorporate technology standards into its accreditation process. The two organizations jointly issued *Recommended Foundations in Technology for All Teachers* (ISTE, 1996) to define the competencies colleges of education ought to be developing among preservice teachers.

How are the technology skills defined in this standards document best developed? Evidence suggests that adding separate technology courses to the teacher education program of study will not be effective—that technology must be integrated into coursework. In considering the effects of stand-alone technology coursework in teacher education the ISTE/Milken Study came to this unequivocal conclusion:

> The most important finding of the survey is that formal stand-alone information technology (IT) coursework does not correlate well with scores on items dealing with technology skills and the ability to integrate IT into teaching...To increase the technology proficiency of new teachers in K-12 classrooms, training institutions should increase the level of technology integration in their own academic programs...Faculty should be encouraged to model and integrate technology" (Moursund, 1999, p. 3)

The key to helping preservice teachers learn how to use technology in their own teaching is for them to see models of technology integrated into university coursework.

Are university faculty currently modeling and integrating technology into coursework? The ISTE study suggests they are not: data indicate that 50% or fewer teacher education faculty model effective use of technology in professional education courses. Not surprisingly, the study also found that 50% or fewer teaching candidates routinely applied information technology in their field experiences and practice teaching.

How can we ensure that university faculty are knowledgeable about current practices in technology and able to integrate computers into their own teaching? A 1997 Task Force Report by the National Council for Accreditation of Teacher Education recommends increased emphasis on faculty professional development. This recommendation is aimed at improving the technology skills of *current* faculty. We would like to propose an additional recommendation: that *teaching assistants* be targeted for professional development in technology. This measure would be aimed at ensuring that *future* faculty are prepared to use technology in their teaching. The remaining sections of this paper will explain our rationale for making this recommendation and outline the steps we have taken at the University of Washington to implement it in our Teacher Education Program (TEP).

Why Focus on Teaching Assistants?

We have focused our attention on improving the technology skills of teaching assistants as part of a short and long-range effort to integrate technology into teacher education coursework. The short-range plan was based on the idea that a teacher education program could infuse additional

technology into courses by targeting teaching assistants as change agents and support personnel. Teaching assistants occupy a strategic position between students and faculty, and change here could have beneficial effects in both directions. We also had a long-term aim of improving the technology skills of future faculty.

Our belief was that providing professional development in technology to teaching assistants could have immediate effects in courses. With the support of a teaching assistant knowledgeable in technology, university faculty with limited skills might be more confident about using technology. By modeling technology usage in their instructional roles, teaching assistants could also be change agents—giving faculty the impetus to begin incorporating technology into their own pedagogy.

An example of this "trickle up" process occurred in one of our secondary methods courses this past quarter. The technology lab for each methods class is taught by two teaching assistants. In one of these labs, TEP students were shown how to do web page authoring, and each was assisted in setting up their own web page. The TA's then persuaded the professor to allow students to have the option of publishing one class paper on the web. As students were writing the paper, one student commented to the class e-mail list:

> I have heard more than one person in our section wishing that they could see examples of previous papers. Wouldn't it be nice if you could check some out on [the teacher's] website? I'd certainly be much more likely to do so than if they were in some binder in the corner of her office.

The professor's response to the list was a prompt and rather plaintive wish to be able to meet her students' desire for web-published models:

> Oh, how I wish I had a website I could refer you to for copies of past autobiographies! I DO have archaic printed versions you can check out, and one of these days, I hope I'll learn to put together a website as well.

As a result of the student request (and TA assistance), this professor has now spent several hours being tutored on web authoring software and has established her own course web page. Teaching assistants who are skilled users of technology can have just this sort of immediate impact on both TEP students and faculty.

In addition to this short-range objective of incorporating technology into coursework, our project also had a long-range perspective. If teaching assistants are not assisted in developing technology skills as part of their own program of study as preservice teacher *educators*, are we not perpetuating the problem of university faculty being unable to integrate technology into coursework? Thus, we conceived of this plan as a more long-term effort to infuse technology into teacher education—many of our TEP TA's will one day be university teacher educators and, hopefully, will be better prepared to use technology than current faculty.

What We've Done

Our program for improving the technology skills of the 18 teaching assistants in the Teacher Education Program (TEP) at the University of Washington had four main parts. We began by incorporating ISTE/NCATE technology standards into the PSTE Goals and Targets (Adriance & Jay, 2000).

As explained by Adriance & Jay, McKenna (2000), and Snell (2000), these goals and targets were to become part of each teaching assistants' own personal professional development plan. Next, we administered a survey to determine exactly what technology skills this group of TA's might have. Having identified areas of weakness, we then embarked on an effort to improve those skills through a series of workshops offered to all TA's during a weekly seminar. Finally, we encouraged TA's to join TEP students in learning how to construct an electronic portfolio. I will elaborate on each of these steps.

Technology Goals and Targets

Because we have incorporated ISTE/NCATE technology standards into the goals and targets for the TEP, we incorporated those same standards into the PSTE Goals and Targets—believing that TA's ought to be able to demonstrate the same competencies as students in the program. Each TA chose one or more targets to focus on for the quarter; each would produce a portfolio artifact at the end of the quarter to document their progress in meeting that target. The artifact and the teaching assistant's reflection on it would be evidence for their quarterly performance review.

In making these standards part of each TA's goal-setting and assessment program, we were following the adage, "That which gets measured, gets done." Three of the 18 TEP TA's chose goals in technology for their personal development and assessment during the first quarter these standards were in place.

A Survey of TA Technology Skills

In order to determine areas of strength and weakness in technology, we asked the TA's to complete an on-line survey (Carney, 1999). This technology survey is the same device used to gauge the skills of incoming TEP students. The results not only gave us information on the specific skills of TA's, but also confirmed our sense that technology training is badly needed for preservice teacher educators.

We found that TA technology skills are significantly lower than those of students in the incoming elementary cohort. When asked how they would describe themselves as computer users, 82.4% of the 17 teaching assistants who responded to the survey described themselves as competent or expert. Among the TEP students, 97.5% described themselves as competent or expert (see Appendix A). This general question was followed by a series of questions about specific technology skills, ranging from using the operating system to constructing web pages; in 13 of these 19 categories, a higher percentage of the TEP students rated themselves as competent or advanced than the TA's (Appendix B).

On the basis of our survey, it seems that TEP students are much more technologically adept than the teaching assistants. If nothing is done about this skills gap, these future teacher education faculty are unlikely to model technology integrated into coursework or to be able to assist preservice teachers in doing the same. With this concern in mind, we began to incorporate workshops in various technologies into our weekly TA seminar.

A Series of Technology Workshops

We began our technology workshops with an offering that we hoped would prove most immediately useful for the teaching assistants, many of whom were in their first year of doctoral studies—instruction in using Endnotes, a software application for creating bibliographic databases and in-text citation. The second workshop was a two-hour session in how to construct a web page and upload it to the university server. Our intention was to have as many TA's as possible create their own web site and become familiar with the web-editing software because we wanted to encourage them to participate in the electronic portfolio workshop being offered for TEP students the following quarter.

Developing an Electronic Portfolio

As a final requirement for their Masters in Teaching degree, all University of Washington TEP students put together a teaching portfolio. An increasing number of these students are choosing to do a web-based electronic portfolio. After doing research on the portfolios completed last year, we realized that TEP students who chose the electronic option were going to need special support and mentoring—and, thus, we needed teaching assistants who would be able to provide that support in weekly small-group portfolio sessions. Five TA's have joined this quarter's electronic portfolio class, and two of them are mentoring special small-group sections for the TEP students doing web portfolios.

This quarter we are offering a follow-up session on web page design and are encouraging TA's to do electronic portfolios themselves. To make this task easier, we have made templates for the required parts of the portfolio and TA's have begun to submit electronic versions of their entry slips and artifacts (Carney, 2000).

Summary

Teaching assistants should not be forgotten when colleges of education consider how to better integrate technology into coursework. They are important resources—change agents and support personnel—for university faculty attempting to model wise technology use for preservice teachers. Teaching assistants are also future teacher educators whose professional development needs include technology skills. NCATE has adopted Recommended Foundations in Technology for All Teachers (ISTE, 1996)—those competencies should also be goals for preservice teacher educators. Our program gives some ideas about how teaching assistants might be helped to learn what they need to know about technology.

I began with Cheryl Lemke's comment: "Today's students live in a global, knowledge-based age, and they deserve teachers whose practice embraces the best that technology can bring to learning," In quoting Lemke, Marjorie DeWert (1999b) adds, "Surely *tomorrow's* teachers deserve the same" (p. 4). I would take this one step further: Surely tomorrow's *teacher educators* deserve assistance in developing a practice that embraces the best technology can bring to learning as well.

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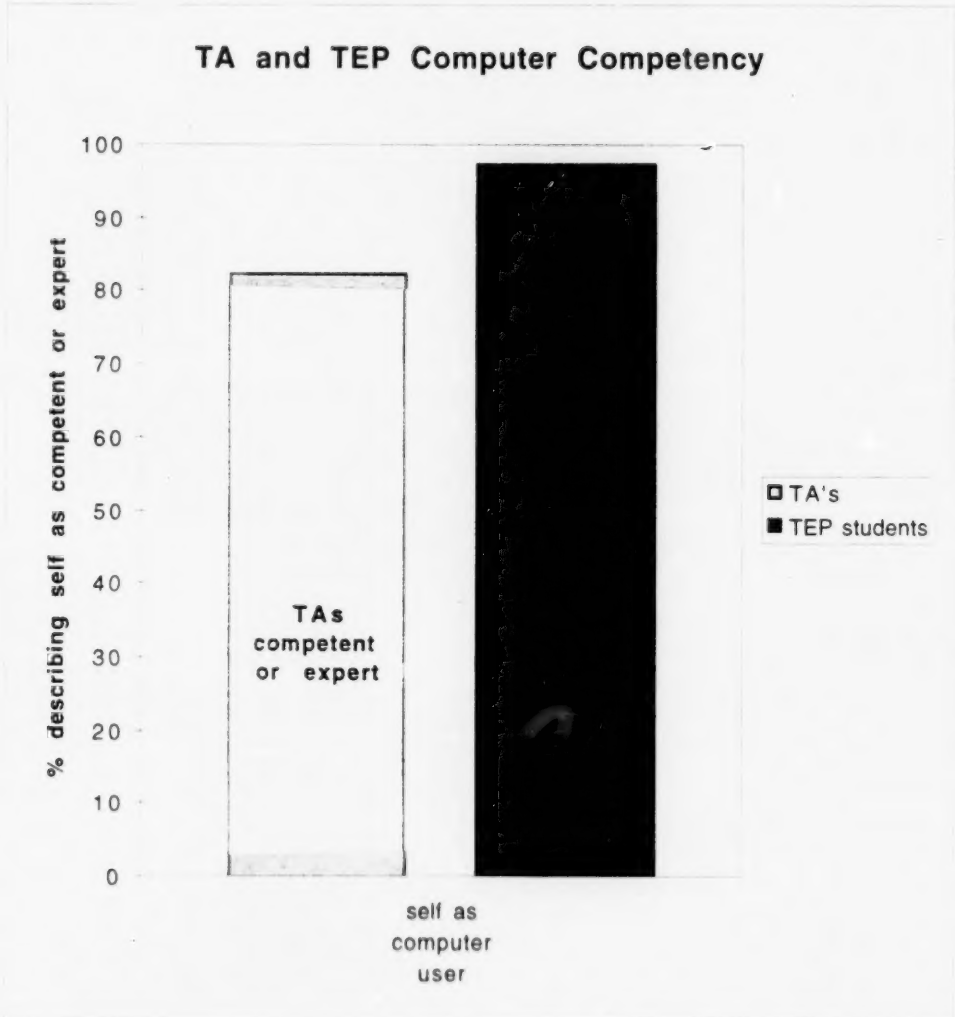
Appendix A:

TA and TEP Student Computer Competency



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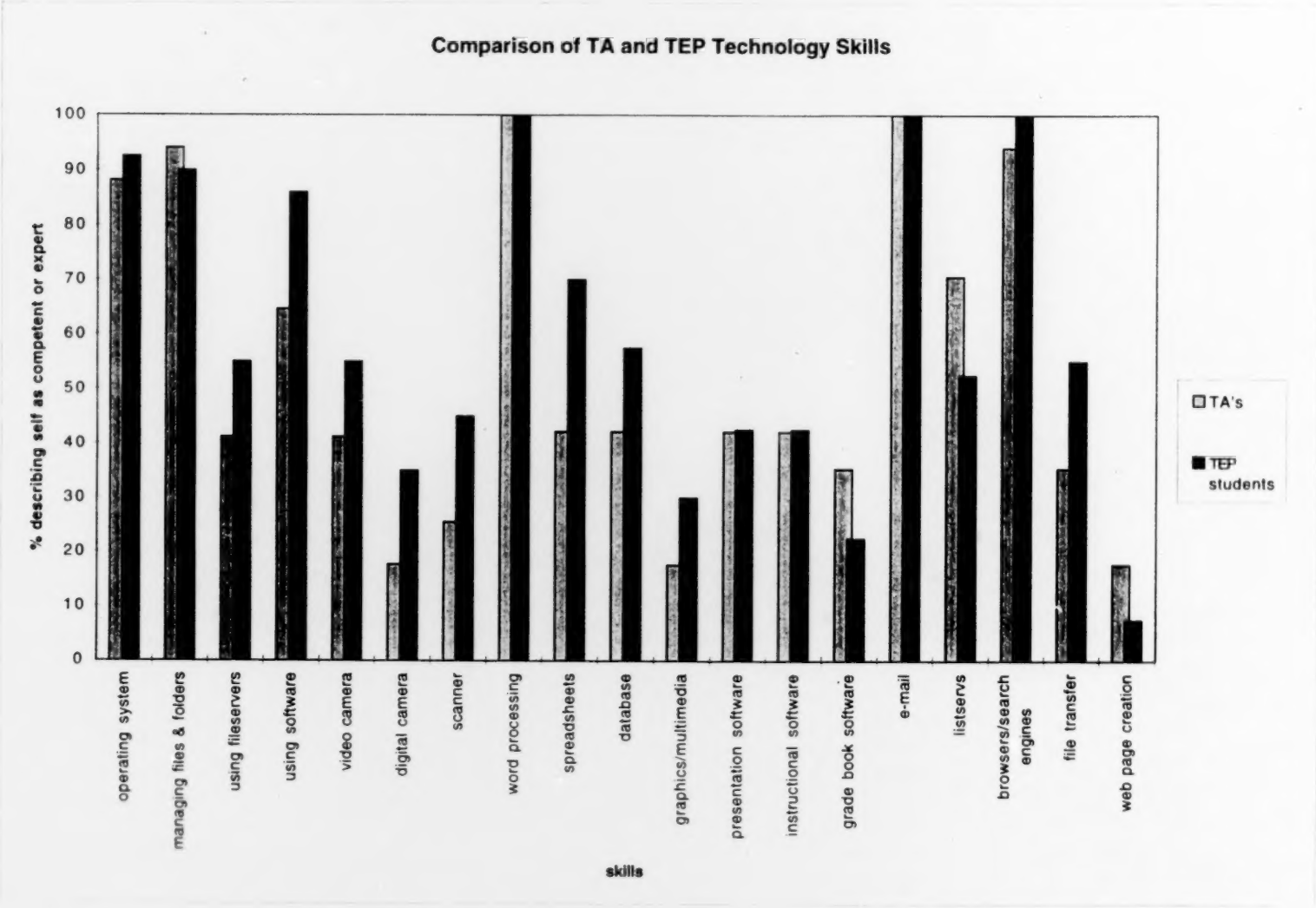
Appendix B:

TA and TEP Student Computer Skills



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